Appl. No.:   09/523,446
Amdt. dated June __, 2004   𝔻ℝ𝔸𝔽𝕋
Reply to Office action of April 06, 2004

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1.   (Canceled).

2.   (Currently amended) A method as in claim 27. A method for detecting telecommunication fraud performed in a data processing system having a data warehouse and an OLAP server, the method comprising:

retrieving a plurality of call records from the data warehouse;

generating a calling profile cube based on the call records; wherein the calling profile cube includes information on multiple customers;

generating a volume-based calling pattern cube for each individual customer based on the multi-customer calling profile cube;

comparing the volume-based calling pattern cube for each customer to a predetermined fraudulent volume-based calling pattern; and

when the volume-based calling pattern cube is in a first predetermined relationship with predetermined fraudulent volume-based calling pattern, performing a first action,

wherein said data warehouse has a call table and a profile table[[,]] and wherein the step of generating a calling profile cube based on the records further comprises the steps of:

retrieving records from the call table and based thereon generating a snapshot cube representing the records from the call table, said snapshot cube having predetermined dimensions;

retrieving records from the profile table and based thereon generating a profile cube representing the records from the profile table, said profile cube having predetermined dimensions that are the same as the dimensions of the snapshot cube;

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merging the snapshot cube and the profile cube to generate an updated profile cube; and

deriving the volume-based calling pattern cubes based on the updated profile cube.

3.   (Previously presented) ~~A method as in claim 27~~A method for detecting telecommunication fraud performed in a data processing system having a data warehouse and an OLAP server, the method comprising:

retrieving a plurality of call records from the data warehouse;

generating a calling profile cube based on the call records; wherein the calling profile cube includes information on multiple customers;

generating a volume-based calling pattern cube for each individual customer based on the multi-customer calling profile cube;

comparing the volume-based calling pattern cube for each customer to a predetermined fraudulent volume-based calling pattern; and

when the volume-based calling pattern cube is in a first predetermined relationship with predetermined fraudulent volume-based calling pattern, performing a first action,

wherein ~~the step of when the volume-based calling pattern cube is in a first predetermined relationship with predetermined fraudulent volume-based calling pattern,~~ performing a first action includes one of:

flagging a particular caller with the volume-based calling pattern being analyzed as suspicious;

automatically generating an alert that specifies callers with suspicious volume-based calling pattern;

performing further investigation on callers with suspicious volume-based calling pattern;

cancellation of telephone services for callers with suspicious volume-based calling pattern; and

performing other appropriate remedial actions.

4-5.   Canceled.

6.   (Currently amended) ~~A method as in claim 27~~ A method for detecting telecommunication fraud performed in a data processing system having a data warehouse and an OLAP server, the method comprising:

    retrieving a plurality of call records from the data warehouse;

    generating a calling profile cube based on the call records; wherein the calling profile cube includes information on multiple customers;

    generating a volume-based calling pattern cube for each individual customer based on the multi-customer calling profile cube;

    comparing the volume-based calling pattern cube for each customer to a predetermined fraudulent volume-based calling pattern; and

when the volume-based calling pattern cube is in a first predetermined relationship with predetermined fraudulent volume-based calling pattern, performing a first action,

    wherein the predetermined fraudulent volume-based calling pattern in one of a personalized calling pattern and a group-based pattern.

7.   (Previously presented) A method as in claim 2 further comprising:

    storing the updated profile cube into the profile table in the data warehouse; and

    performing data staging between the profile table and the updated profile cube at predetermined time intervals.

8.   (Previously presented) A method as in claim 2 wherein said profile cube, snapshot cube, and updated profile cube each includes at least two dimensions and at least two levels.

9.   (Previously presented) A method as in claim 8 further comprising:

    analyzing the calling pattern cube by utilizing at least one OLAP operation along more than one level.

10.   (Previously presented) A method as in claim 8 further comprising:

analyzing the calling pattern cube by utilizing at least one OLAP operation along more than one dimension.

11.   (Previously presented) A method as in claim 2 wherein the profile cube, snapshot cube, and the updated profile cube each are multi-level and multi-dimensional cubes.

12.   (Previously presented) A method as in claim 2 wherein the profile table and the call table each has a plurality of attributes, and the profile cube and snapshot cube each has a plurality of dimensions, said attributes corresponding in a one-to-one fashion to the dimensions.

13.   (Previously presented) A method as in claim 2 wherein the profile cube includes at least one cell having probability based values.

14.   (Previously presented) A data processing system comprising:

a data warehouse for storing data in a relational format, said data warehouse including a profile table and a call table;

an OLAP server, coupled to the data warehouse, for providing predetermined OLAP operations; and

a profile engine, coupled to the data warehouse for computing, maintaining and utilizing caller pattern cubes that represent caller profiles; wherein the caller pattern cubes can be utilized to detect telecommunication fraud.

15.   (Currently amended) ~~A data processing system as in claim 14 further comprising:~~ A data processing system comprising:

a data warehouse for storing data in a relational format, said data warehouse including a profile table and a call table;

an OLAP server, coupled to the data warehouse, for providing predetermined OLAP operations;

a profile engine, coupled to the data warehouse for computing, maintaining and utilizing caller pattern cubes that represent caller profiles; wherein the caller pattern cubes can be utilized to detect telecommunication fraud; and

a fraud detection module for detecting telecommunication fraud by comparing known fraudulent profiles to caller pattern cubes;

the profile engine further generating a profile cube from information selected from the profile table, generating a snapshot cube, updating the profile cube by merging the profile cube and the snapshot cube to generate an updated profile cube, and deriving a calling pattern cube based on the updated profile cube; wherein the profile engine is a scalable computation engine that is implemented by OLAP programming supported by the OLAP server.

16-28.   Canceled.

29.   (Previously presented) A method as in claim 28 A method for detecting telecommunication fraud performed in a data processing system having a data warehouse and an OLAP server, the method comprising:

retrieving a plurality of call records from the data warehouse;

generating a calling profile cube based on the call records; wherein the calling profile cube includes information on multiple customers;

generating a volume-based calling pattern cube for each individual customer based on the multi-customer calling profile cube;

generating a probability-based calling pattern cube based on the volume-based calling pattern cube for each individual customer;

comparing the probability-based calling pattern cube for each customer to a predetermined fraudulent probability-based calling pattern;

when the probability-based calling pattern cube is in a first predetermined relationship with predetermined fraudulent probability-based calling pattern, performing a first action,

wherein ~~the step of when the probability-based calling pattern cube is in a first predetermined relationship with predetermined fraudulent probability-based calling pattern,~~ performing a first action includes one of:

> flagging a particular caller with the probability-based calling pattern being analyzed as suspicious;
>
> automatically generating an alert that specifies callers with suspicious probability-based calling pattern;
>
> performing further investigation on callers with suspicious probability-based calling pattern;
>
> cancellation of telephone services for callers with suspicious probability-based calling pattern; and
>
> performing other appropriate remedial actions.

30.   (Previously presented) The method of claim 29 wherein the probability-based calling patterns enables one of the analysis and comparison of a first probability-based calling patterns that covers a first time period with a second probability-based calling patterns that covers a second time period.

31-35.   Canceled.